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DEPARTMENT OF COMMERCE

National Oceanic and Atmospheric Administration

RIN 0648-XE727

Takes of Marine Mammals Incidental to Specified Activities; Taking Marine Mammals Incidental to Maintenance, Repair, and Decommissioning of a Liquefied Natural Gas Facility off Massachusetts

AGENCY: National Marine Fisheries Service (NMFS), National Oceanic and Atmospheric Administration (NOAA), Commerce.

ACTION: Notice; proposed incidental harassment authorization; request for comments.

SUMMARY: NMFS has received an application from Neptune LNG LLC (Neptune) for an Incidental Harassment Authorization (IHA) to take marine mammals, by harassment, incidental to maintenance, repair, and decommissioning activities at its liquefied natural gas (LNG) deepwater port (Port) off the coast of Massachusetts. Pursuant to the Marine Mammal Protection Act (MMPA), NMFS is requesting comments on its proposal to issue an IHA to Neptune to take, by Level B harassment only, fourteen species of marine mammals during the specified activity.

DATES: Comments and information must be received no later than [*insert date 30 days after date of publication in the FEDERAL REGISTER*].

ADDRESSES: Comments on the application should be addressed to Jolie Harrison, Chief, Permits, Conservation and Education Division, Office of Protected Resources, National Marine Fisheries Service, 1315 East West Highway, Silver Spring, MD 20910. The mailbox address for providing email comments is ITP.DALY@noaa.gov. NMFS is not responsible for email

comments sent to addresses other than the one provided here. Comments sent via e mail, including all attachments, must not exceed a 25 megabyte file size.

Instructions: All comments received are a part of the public record and will generally be posted to *http://www.nmfs.noaa.gov/pr/permits/incidental.htm* without change. All personally identifiable information (for example, name, address, etc.) voluntarily submitted by the commenter may be publicly accessible. Do not submit confidential business information or otherwise sensitive or protected information.

An electronic copy of the application may be obtained by writing to the address specified above, telephoning the contact listed below (see **FOR FURTHER INFORMATION CONTACT**), or visiting the internet at: *http://www.nmfs.noaa.gov/pr/permits/incidental.htm*. The following associated documents are also available at the same Internet address: Biological Opinion on the Effects of the Maritime Administration's (MARAD) issuance of a license to Neptune to own and operate a LNG deepwater port off the coast of Massachusetts on Threatened and Endangered Species (NMFS, 2010) and a list of references used in this document. The MARAD and U.S. Coast Guard (USCG) Final Environmental Impact Statement (EIS) is available for viewing at http://www.regulations.gov by entering the search words "Neptune LNG."

FOR FURTHER INFORMATION CONTACT: Jaclyn Daly, Office of Protected Resources, NMFS, (301) 427-8401.

SUPPLEMENTARY INFORMATION:

Background

Sections 101(a)(5)(A) and (D) of the MMPA (16 U.S.C. 1361 *et seq.*) direct the Secretary of Commerce to allow, upon request, the incidental, but not intentional, taking of small numbers

of marine mammals by U.S. citizens who engage in a specified activity (other than commercial fishing) within a specified geographical region if certain findings are made and either regulations are issued or, if the taking is limited to harassment, a notice of a proposed authorization is provided to the public for review.

Authorization for incidental takings shall be granted if NMFS finds that the taking will have a negligible impact on the species or stock(s), will not have an unmitigable adverse impact on the availability of the species or stock(s) for subsistence uses (where relevant), and if the permissible methods of taking and requirements pertaining to the mitigation, monitoring and reporting of such takings are set forth. NMFS has defined "negligible impact" in 50 CFR 216.103 as "an impact resulting from the specified activity that cannot be reasonably expected to, and is not reasonably likely to, adversely affect the species or stock through effects on annual rates of recruitment or survival."

Section 101(a)(5)(D) of the MMPA established an expedited process by which citizens of the United States can apply for an authorization to incidentally take small numbers of marine mammals by harassment. Section 101(a)(5)(D) establishes a 45-day time limit for NMFS' review of an application followed by a 30-day public notice and comment period on any proposed authorizations for the incidental harassment of marine mammals. Within 45 days of the close of the comment period, NMFS must either issue or deny the authorization.

Except with respect to certain activities not pertinent here, the MMPA defines "harassment" as:

> any act of pursuit, torment, or annoyance which (i) has the potential to injure a marine mammal or marine mammal stock in the wild ("Level A harassment"); or (ii) has the potential to disturb a marine mammal or marine mammal stock in the wild by causing

disruption of behavioral patterns, including, but not limited to, migration, breathing, nursing, breeding, feeding, or sheltering ("Level B harassment").

Summary of Request

NMFS received an application on May 28, 2016, from Neptune for the taking, by harassment, of marine mammals incidental to maintenance, repair, and decommissioning activities, at its Port facility in Massachusetts Bay off the coast of Massachusetts. NMFS reviewed Neptune's application and requested clarification on some portions. After addressing comments from NMFS, Neptune modified its application and submitted a revised application on August 11, 2016. The August 11, 2016, application is the one available for public comment (see ADDRESSES) and considered by NMFS for this proposed IHA.

NMFS has issued several incidental harassment authorizations for the take, by Level B harassment only, of marine mammals to Neptune. NMFS issued a one-year IHA in June 2008, for the construction of the DWP (73 FR 33400 [June 12, 2008), which expired on June 30, 2009. NMFS issued a second one-year IHA to Neptune for the completion of construction and beginning of Port operations on June 26, 2009 (74 FR 31926 [July 6, 2009]). NMFS issued a third 1-year IHA (75 FR 41440 [July 16, 2010]) for ongoing operations followed by a five-year rulemaking and Letter of Authorization (LOA) 76 FR 34157 [June 13, 2011]), which expired on July 10, 2016. Although Neptune intended to operate the port for over 25 years, changes in the natural gas market have resulted in the company halting production operations. During the period of this proposed IHA, Neptune intends to decommission the port in its entirety and conduct any unscheduled maintenance activities, if needed, prior to decommissioning.

The Neptune Port is located approximately 22 miles (mi) (35 kilometers (km)) northeast of Boston, Massachusetts, in Federal waters approximately 260 feet (ft) (79 meters (m)) in depth.

Take of marine mammals may occur from dynamic positioning (DP) vessel thruster use, including dive support vessels (DSVs) and potentially one heavy lift vessel (HLV), while maneuvering (*e.g.*, docking, undocking, and occasional weathervaning (turning of a vessel at anchor from one direction to another under the influence of wind or currents) during port maintenance, repair, and decommissioning. Neptune has requested authorization to take the following 14 marine mammal species by Level B harassment: North Atlantic right whale (*Eubalaena glacialis*), fin whale (*Balaenoptera physalus*), humpback whale (*Megaptera novaeangliae*), minke whale (*Balaenoptera acutorostrata*), sei whale (*Balaenoptera boreali*), Atlantic white-sided dolphin (*Lagenorhynchus acutus*), long-finned pilot whale (*Globicephala melas*), harbor porpoise (*Phocoena phocoena*), bottlenose dolphin (*Tursiops truncatus*), short beaked common dolphin (*Delphinus delphis*), Risso's dolphin (*Grampus griseus*), killer whale (*Orcinus orcus*), harbor seal (*Phoca vitulina*), and grey seal (*Halichoerus grypus*). NMFS has preliminarily determined to authorize take, by Level B harassment only, of these species incidental to DP vessel thruster use during maintenance, repair, and decommissioning activities.

Description of the Specified Activity

Overview

The Neptune Port began operations in 2009-2010, with the intention to import LNG into the New England region. The Port consists of a submerged buoy system to dock specifically designed LNG carriers approximately 22 mi (35 km) northeast of Boston, Massachusetts, in Federal waters approximately 125-250 ft (38 -76 m) in depth. It is located west (*i.e.*, inshore) of and adjacent to the Stellwagen Bank National Marine Sanctuary (NMS). The Port consists of two mooring and unloading buoys separated by approximately 2.1 mi (3.4 km) (also known as the north and south buoy) and a pipeline that receives natural gas from "shuttle and regasification

vessels" (SRVs), through a flexible riser that connects to a 24-inch (in) subsea flowline and ultimately into a 24-in gas transmission line. This gas transmission line connects to the existing 30-in Algonquin HubLine gas pipeline. A hot tap valve (herein after "hot tap") unit used to control gas flow from the Algonquin pipeline to Neptune's gas transmission line is located inshore of the buoys in water approximately 122 ft (37 m). The locations of the Neptune port facilities, including the north buoy, south buoy and hot tap are shown in Figure 2-1 in Neptune's application (see ADDRESSES). All decommissioning and unscheduled maintenance and repair work will take place at the north and south buoys and at the hot tap in succession with limited transit between locations.

Dates and Duration

Decommissioning will occur for up to 70 days between May 1 and November 30, 2017. Unscheduled maintenance and repair work may occur prior to decommissioning, if needed, and last up to 14 days.

Detailed Description of Activities

Maintenance, repair, and decommissioning of the Port will require docking, undocking, and occasional weathervaning of DP vessels at the north buoy, south buoy, and hot tap via the use of bow and stern thrusters. Operation and specifications of DP vessels is provided in the "Vessel Activity" section below. For purposes of this IHA, the activity that may result in the take, by Level B harassment, of marine mammals is limited to use of these thrusters. A summary of the type of work performed during maintenance, repair, and decommissioning requiring vessel operations is also summarized below; however, NMFS does not anticipate incidental take of marine mammals as a result of the actual underwater work (see Neptune's application for a more detailed description of this work).

Maintenance and Repair

At this time, Neptune does not anticipate maintenance or repair of Port equipment will be necessary (the Port is not currently operating); however, they are requesting authorization of take incidental to thruster use during maintenance and repair should an unanticipated issue arise with port equipment prior to decommissioning. Unscheduled maintenance and repair activities requiring limited excavation to access the pipeline, or cathodic protection maintenance, are authorized by the Federal Energy Regulatory Commission (FERC). Unplanned maintenance and repair would be relatively minor and of short duration. Example unscheduled maintenance activities may include repair of flange or valve leaks, replacing faulty pressure transducers, or unscheduled maintenance on valves. Neptune may use a remotely operated underwater vehicle (ROV) to perform these tasks. These minor unscheduled maintenance and repair activities will be completed within a few days to two weeks, depending on the nature of the problem.

Should any unplanned maintenance be required, a DSV would be the primary vessel used to complete the activities in the timeliest manner. The category of DSV and corresponding support vessels would be dictated by the type of work required, the water depth at the work location, vessel availability, and expected duration of the maintenance or repair.

Decommissioning

Neptune intends to decommission the Port in its entirety. Decommissioning involves seven major steps: isolation and closure of hot tap and removal of tie-in spool; pipeline decommissioning and abandonment; disconnection and removal of risers and umbilicals, and submerged turret loading (STL) buoys; covering suction piles used as anchoring/mooring with trawl protector; removal of mooring lines (anchor chain and wire rope); removal of pipeline end maninfolds (PLEMs) and hot tap; and removal of two seafloor position transponders (one at each

buoy). All recovery of decommissioned equipment would be done using a crane aboard the DSV and parts staged on the anchored barge to be taken to shore via a tug. Neptune's application provides more detail regarding these activities. NMFS has preliminarily determined only the use of thrusters from vessels necessary to perform the work has the potential to result in the take of marine mammals, by Level B harassment.

Vessel Activity

The planned scenario for the duration of all proposed activities would include the mobilization of a DSV, tug, an anchored barge, and intermittent use of a crew vessel with the DSV being a DP vessel. Two types of DP vessels may be used to support Port maintenance, repair, and decommissioning: a DSV and a HLV. Only one DSV or HLV vessel is expected to be working at any one time. However, in the unlikely event that two DSVs (or one DSV and one HLV) are necessary at the same time, they would remain at least 1000 m from each another. The specifications of the HLV are similar to that of the DSV and would be performing the same duties as a DSV. The DP vessel would likely be 120 m in length and equipped with two 1,500 kW forward thrusters and one 1,500 kilowatt (kW) aft thruster (total 4,500 kW). Neptune would operate the thrusters for up 24 hours per day at 50 percent load or less for a maximum 10 weeks. Proxy DSV and HLV vessels used in Neptune's acoustic modeling, as described in Table 1-4 of Neptune's application, were 107 m and 144 m, respectively, with corresponding total thruster power of 3,752 kW and 4,600 kW. For comparison, previous incidental take authorizations included take of marine mammals based on sound source verification measurements from thrusters on a shuttle regasification vessel (SVRs) planned for use during Port operation. The SVR was 280 m in length and equipped with two 2,000-kW bow thrusters and two 1,200-kW

stern thrusters (total 6,400 kW). During the measurements, the SRV operated thrusters at 100 percent load as this was the predicted scenario during Port operation.

In general, the DSV will transit to either the STL buoy or PLEM and complete all work at the site prior to moving to the next location. The DSV would operate in dynamic positioning mode and would support all diving and ROV operations required to perform the work. The support tug will anchor the barge and would occasionally be required for barge handling activities when equipment transport and/or staging are required. The crew/supply vessel would be used intermittently for personnel and supply transfers. A survey vessel would be used for a brief period of time (no more than five days) at the end of the project to perform an "as-left" survey.

Description of Marine Mammals in the Area of the Specified Activity

Massachusetts Bay (as well as the entire Atlantic Ocean) hosts a diverse assemblage of marine mammals. Table 3-1 in Neptune's application outlines 20 marine mammal species with distributions or sighting records within the general activity region. However, six are very rare or unlikely to inhabit the geographic range which many ensonified by the proposed activity area and therefore are not expected to be affected at any level by the proposed activities. These species include: blue whale (*Balaenoptera musculus*), striped dolphin (*Stenella coeruleoalba*), Atlantic white-sided dolphin (*Lagenorhynchus acutus*), sperm whale (*Physeter macrocaphalus*), hooded seal (*Cystophora cristata*), and harp seal (*Phoca groenlandica*). Blue and sperm whales are not commonly found in Massachusetts Bay with blue whale most commonly seen off the Canada coast. The sperm whale is generally a deepwater animal, and its distribution off the Northeastern United States is concentrated around the 13,280 ft (4,048 m) depth contour, with sightings extending offshore beyond the 6,560 ft (2,000 m) depth contour. Sperm whales can also be seen

in shallow water south of Cape Cod from May to November. Harp and hooded seals are seasonal visitors from much further north, seen mostly in the winter and early spring. Prior to 1990, harp and hooded seals were sighted only very occasionally in the Gulf of Maine, but recent sightings suggest increasing numbers of these species now visit these waters. Juveniles of a third seal species, the ringed seal, are seen on occasion as far south as Cape Cod in the winter, but this species is considered to be quite rare in these waters. Due to the rarity of these species in the project area, NMFS is not proposing to authorize take, by harassment, of these species or stocks and; therefore, they are not discussed further in this proposed IHA notice. The bottlenose dolphin and killer whale are also unlikely to occur within the proposed activity area. However, given their wide distribution and transient behavior, they remain in the group of species potentially affected by proposed activities.

Therefore, NMFS proposes to issue an IHA for Level B harassment for the following 14 species: North Atlantic right whale; fin whale; humpback whale; minke whale; sei whale; harbor porpoise; bottlenose dolphin; killer whale; long-finned pilot whale; Atlantic white-sided dolphin; short beaked common dolphin; Risso's dolphin; grey seal; and harbor seal (Table 1).

Table 1. Species likely to occur within the project area. (E= endangered, D= depleted, NL = not listed, ND= not depleted, unk = unknown).

Common Name	Scientific Name	Stock	Status	Estimated population (Waring et al., 2015)	Occurrence
North Atlantic right whale	*Eubalaena glacialis*	Western Atlantic	E, D	476	occasional
Fin whale	*Balaenoptera physalus*	Western North Atlantic	E,D	1,618	occasional
Humpback whale	*Megaptera novaeangliae*	Gulf of Maine	E,D	823	occasional
Minke whale	*Balaenoptera acutorostrata*	Canadian East Coast	NL, ND	20,741	occasional

Common Name	Scientific Name	Stock	Status	Estimated population (Waring et al., 2015)	Occurrence
Sei whale	*Balaenoptera borealis*	Novia Scotia	E,D	357	occasional
Atlantic white-sided dolphin	*Lagenorhynchus acutus*	Western North Atlantic	NL, ND	48,819	occasional
Long-finned pilot whale	*Globicephala melas*	Western North Atlantic	NL, ND	26,535	occasional
Harbor porpoise	*Phocoena phocoena*	Gulf of Maine / Bay of Fundy	NL, ND	79,883	not common
Bottlenose dolphin	*Tursiops truncatus*	Western North Offshore Atlantic	NL, ND	77,532	not common
Short beaked common dolphin	*Delphinus delphis*	Western North Atlantic	NL, ND	173,486	occasional
Risso's dolphin	*Grampus griseus*	Western North Atlantic	NL, ND	18,250	not common
Killer whale	*Orcinus orca*	Western North Atlantic	NL, ND	unk	not common
Harbor seal	*Phoca vitulina*	Western North Atlantic	NL, ND	75,834	occasional
Grey seal	*Halichoerus grypus*	Western North Atlantic	NL, ND	unk	occasional

The North Atlantic right, fin, humpback, and sei, whales are listed as endangered under the Endangered Species Act (ESA) and as depleted under the MMPA. Certain stocks or populations of killer whales are listed as endangered under the ESA or depleted under the MMPA; however, none of those stocks or populations occurs in the project area. All other species are not listed under the ESA nor considered depleted under the MMPA. A brief description of distribution and abundance of species potentially taken by the specified activity is provided below. Information within these summaries is taken from NMFS stock assessment reports, as reviewed in Waring *et al.* (2015).

North Atlantic Right Whale

North Atlantic right whales are distributed widely across the southern Gulf of Maine in spring with highest abundance located over the deeper waters (100 to 160 m, or 328 to 525 ft, isobaths) on the northern edge of the Great South Channel (GSC) and deep waters (100-300 m, 328-984 ft) parallel to the 100 m (328 ft) isobath of northern Georges Bank and Georges Basin. High abundance was also found in the shallowest waters (< 30 m, <98 ft) of Cape Cod Bay (CCB), over Platts Bank and around Cashes Ledge. Lower relative abundance is estimated over deep-water basins including Wilkinson Basin, Rodgers Basin, and Franklin Basin. In the summer months, right whales move almost entirely away from the coast to deep waters over basins in the central Gulf of Maine (Wilkinson Basin, Cashes Basin between the 160 and 200 m (525 and 656 ft) isobaths and north of Georges Bank (Rogers, Crowell, and Georges Basins). Highest abundance is found north of the 100 m (328 ft) isobath at the GSC and over the deep slope waters and basins along the northern edge of Georges Bank. The waters between Fippennies Ledge and Cashes Ledge are also estimated as high-use areas. In the fall months, right whales are sighted infrequently in the Gulf of Maine, with highest densities over Jeffreys Ledge and over deeper waters near Cashes Ledge and Wilkinson Basin. In winter, CCB, Scantum Basin, Jeffreys Ledge, and Cashes Ledge are the main high-use areas. The Stellwagen Bank NMS, located just east of the Port, does not appear to support a high abundance of right whales; sightings are reported for all four seasons, albeit at low relative abundance. The highest sighting rate within Stellwagen Bank NMS occurs along the southern edge of the Bank.

Right whales frequent Massachusetts and CCB from December through July (NMFS, 2010). Neptune acoustically detected right whales in greatest abundance near the Port in March and April since beginning their long-term acoustic monitoring plan developed during issuance of previous incidental take authorizations. As such, NMFS set forth conditions in previous

incidental take authorizations and its 2010 Biological Opinion to Neptune to conduct all work from May 1to November 30, annually, to the greatest extent practicable, to avoid times when right whales are most abundant.

As reviewed in Waring *et al.* (2015), a review of the North Atlantic right whale photo-ID recapture database as it existed on October 20, 2014, indicated that 476 individually-recognized whales in the catalog were known to be alive during 2011. This number represents a minimum population size. The minimum number alive population index calculated from the individual sightings database for the years 1990-2011 suggests a positive and slowly accelerating trend in population size. These data reveal a significant increase in the number of catalogued whales with a geometric mean growth rate for the period of 2.8 percent.

For the period 2009 through 2013, the minimum rate of annual human-caused mortality and serious injury to right whales averaged 4.3 per year. This is derived from two components: (1) incidental fishery entanglement records at 3.4 per year, and (2) ship strike records at 0.9 per year. The stock assessment report for this stock (Waring *et al.*, 2015) sets the potential biological removal (PBR) level at 0.9; therefore, any mortality or serious injury for this stock can be considered significant. The Western North Atlantic stock is considered strategic by NOAA because the average annual human-related mortality and serious injury exceeds PBR, and because the North Atlantic right whale is an endangered species.

Humpback Whale

The highest abundance for humpback whales is distributed primarily along a relatively narrow corridor following the 100 m (328 ft) isobath across the southern Gulf of Maine from the northwestern slope of Georges Bank, south to the GSC, and northward alongside Cape Cod to Stellwagen Bank and Jeffreys Ledge. The relative abundance of whales increases in the spring

with the highest occurrence along the slope waters (between the 40 and 140 m (131 and 459-ft) isobaths) off Cape Cod and Davis Bank, Stellwagen Basin and Tillies Basin and between the 50 and 200 m (164 and 656 ft) isobaths along the inner slope of Georges Bank. High abundance was also estimated for the waters around Platts Bank. In the summer months, abundance increases markedly over the shallow waters (<50 m, or <164 ft) of Stellwagen Bank, the waters (100-200 m, 328-656 ft) between Platts Bank and Jeffreys Ledge, the steep slopes (between the 30 and 160 m isobaths, 98 and 525 ft isobaths) of Phelps and Davis Bank north of the GSC towards Cape Cod, and between the 50 and 100 m (164 and 328 ft) isobath for almost the entire length of the steeply sloping northern edge of Georges Bank. This general distribution pattern persists in all seasons except winter when humpbacks remain at high abundance in only a few locations including Porpoise and Neddick Basins adjacent to Jeffreys Ledge, northern Stellwagen Bank and Tillies Basin, and the GSC. The minimum population estimate of Gulf of Maine, formerly western North Atlantic, humpback whales is 823 animals (Waring *et al.*, 2015). Current data suggest that the Gulf of Maine humpback whale stock is steadily increasing in size, which is consistent with an estimated average trend of 3.1% in the North Atlantic population overall for the period 1979-1993.

Fin Whale

Spatial patterns of habitat utilization by fin whales are very similar to those of humpback whales. Spring and summer high-use areas follow the 100 m (328 ft) isobath along the northern edge of Georges Bank (between the 50 and 200 m, 164 and 656 ft, isobaths), and northward from the GSC (between the 50 and 160 m, 164 and 525 ft, isobaths). Waters around Cashes Ledge, Platts Bank, and Jeffreys Ledge are all high-use areas in the summer months. Stellwagen Bank is a high-use area for fin whales in all seasons, with highest abundance occurring over the

southern Stellwagen Bank in the summer months. In fact, the southern portion of Stellwagen Bank NMS is used more frequently than the northern portion in all months except winter, when high abundance is recorded over the northern tip of Stellwagen Bank. In addition to Stellwagen Bank, high abundance in winter is estimated for Jeffreys Ledge and the adjacent Porpoise Basin (100 to 160 m, 328 to 525 ft isobaths), as well as Georges Basin and northern Georges Bank. The best abundance estimate available for the western North Atlantic fin whale stock is 1,618 and is based on 2011 NOAA shipboard surveys (Waring *et al.*, 2015). The minimum population estimate for the western North Atlantic fin whale is 1,234. A trend analysis has not been conducted for this stock.

Minke Whale

Like other piscivorus baleen whales, highest abundance for minke whale is strongly associated with regions between the 50 and 100 m (164 and 328 ft) isobath, but with a slightly stronger preference for the shallower waters along the slopes of Davis Bank, Phelps Bank, GSC, and Georges Shoals on Georges Bank. Minke whales are sighted in Stellwagen Bank NMS in all seasons, with highest abundance estimated for the shallow waters (approximately 40 m, 131 ft) over southern Stellwagen Bank in the summer and fall months. Platts Bank, Cashes Ledge, Jeffreys Ledge, and the adjacent basins (Neddick, Porpoise, and Scantium) also support high relative abundance. Very low densities of minke whales remain throughout most of the southern Gulf of Maine in winter. The best estimate of abundance for the Canadian East Coast stock of minke whales, which occurs from the western half of the Davis Strait to the Gulf of Mexico, is 20,741 animals with a minimum estimate of 16,199 individuals (Waring *et al.*, 2015). A trend analysis has not been conducted for this stock.

Long-finned Pilot Whale

The long-finned pilot whale is generally found along the edge of the continental shelf at a depth of 100 -1,000 m (328 -3,280 ft), choosing areas of high relief or submerged banks in cold or temperate shoreline waters. This species is split into two subspecies: the Northern and Southern subspecies. The Southern subspecies is circumpolar with northern limits of Brazil and South Africa. The Northern subspecies, which could be encountered during operation of the Port facility, ranges from North Carolina to Greenland. In the western North Atlantic, long-finned pilot whales are pelagic, occurring in especially high densities in winter and spring over the continental slope, then moving inshore and onto the shelf in summer and autumn following squid and mackerel populations. They frequently travel into the central and northern Georges Bank, GSC, and Gulf of Maine areas during the summer and early fall (May and October). Based on summer 2011 surveys covering waters from central Virginia to the lower Bay of Fundy, the best available estimate for long-finned pilot whales in the western North Atlantic is 5,636 with a minimum population estimate of 3,464 individuals (Waring *et al.,* 2015). Currently, there are insufficient data to determine population trends for the long-finned pilot whale.

Sei Whale

The sei whale is the least likely of all the baleen whale species to occur near the Port. However, four sei whales were sighted by Neptune's protected species observers (PSOs) during the construction phase (ECOES 2010). The Nova Scotia stock of sei whales ranges from the continental shelf waters of the Northeastern United States and extends northeastward to south of Newfoundland. The southern portion of the species range during spring and summer includes the northern portions of the U.S. Atlantic Exclusive Economic Zone (EEZ): the Gulf of Maine and Georges Bank. Spring is the period of greatest abundance in U.S. waters, with sightings concentrated along the eastern margin of Georges Bank and into the Northeast Channel area and

along the southwestern edge of Georges Bank in the area of Hydrographer Canyon. The best estimate of abundance for the Nova Scotia stock is 357 with a minimum of 236 individuals. However, this estimate is considered low and limited given the known range of the sei whale (Waring *et al.,* 2015). There are insufficient data to determine population trends for this species.

Atlantic White-sided Dolphin

In spring, summer and fall, Atlantic white-sided dolphins are widespread throughout the southern Gulf of Maine, with the high-use areas widely located on either side of the 100 m (328 ft) isobath along the northern edge of Georges Bank, and north from the GSC to Stellwagen Bank, Jeffreys Ledge, Platts Bank, and Cashes Ledge. In spring, high-use areas exist in the GSC, northern Georges Bank, the steeply sloping edge of Davis Bank, and Cape Cod, southern Stellwagen Bank, and the waters between Jeffreys Ledge and Platts Bank. In summer, there is a shift and expansion of habitat toward the east and northeast. High-use areas occur along most of the northern edge of Georges Bank between the 50 and 200 m (164 and 656 ft) isobaths and northward from the GSC along the slopes of Davis Bank and Cape Cod. High sightings are also recorded over Truxton Swell, Wilkinson Basin, Cashes Ledge and the bathymetrically complex area northeast of Platts Bank. High sightings of white-sided dolphin are recorded within Stellwagen Bank NMS in all seasons, with highest density in summer and most widespread distributions in spring located mainly over the southern end of Stellwagen Bank. In winter, high sightings were recorded at the northern tip of Stellwagen Bank and Tillies Basin. The best available current abundance estimate for white-sided dolphins in the western North Atlantic stock is 48,819, resulting from a June–August 2011 survey with a minimum population of 30,403 individuals (Waring *et al.,* 2015). A trend analysis has not been conducted for this species.

Killer Whale, Common Dolphin, Bottlenose Dolphin, Risso's Dolphin, and Harbor Porpoise

Although these five species are some of the most widely distributed small cetacean species in the world, they are not commonly seen in the vicinity of the project area in Massachusetts Bay. The total number of killer whales off the eastern U.S. coast is unknown, and present data are insufficient to calculate a minimum population estimate or to determine the population trends for this stock. The best estimate of abundance for the western North Atlantic stock of short-beaked common dolphin is 173,486 with a minimum of 112,531 individuals; a trend analysis has not been conducted for this species (Waring *et al.*, 2015). There are several stocks of bottlenose dolphins found along the eastern U.S. coast from Maine to Florida. The stock that may occur in the area of the Port is the western North Atlantic offshore stock of bottlenose dolphins. The best population estimate of bottlenose dolphins for the stock is 77,532 individuals with a minimum of 56,053 individuals (Waring *et al.*, 2015). There are insufficient data to determine the population trend for this stock. The best estimate of abundance for the western North Atlantic stock of Risso's dolphins is 18,250 with a minimum of 12,619 individuals generated from shipboard and aerial survey conducted between central Florida and the lower Bay of Fundy during June-August 2011 (Waring *et al.*, 2015). There are insufficient data to determine the population trend for this stock. The best estimate of abundance for the Gulf of Maine/Bay of Fundy stock of harbor porpoise is 79,883 with a minimum of 61, 415 individuals (Waring *et al.*, 2015). A trend analysis has not been conducted for this species.

Harbor and Gray Seals

In the U.S. western North Atlantic, both harbor and gray seals are usually found from the coast of Maine south to southern New England and New York. Along the southern New England and New York coasts, harbor seals occur seasonally from September through late May.

In recent years, their seasonal interval along the southern New England to New Jersey coasts has increased. In U.S. waters, harbor seal breeding and pupping normally occur in waters north of the New Hampshire/Maine border, although breeding has occurred as far south as Cape Cod in the early part of the 20th century. The best estimate of abundance for the western North Atlantic stock of harbor seals is 75,834 with a minimum of 66,884 individuals (Waring *et al.*, 2015). A trend analysis has not been conducted for this stock (Waring *et al.*, 2015).

Although gray seals are often seen off the coast from New England to Labrador, within U.S. waters, only small numbers of gray seals have been observed pupping on several isolated islands along the Maine coast and in Nantucket-Vineyard Sound, Massachusetts. Present data are insufficient to calculate the minimum population estimate for U.S. waters; however, in March 2011, a maximum count of 15,756 was obtained in southeastern Massachusetts coastal waters (Waring *et al.*, 2015). Gray seal abundance is likely increasing in the U.S. Atlantic EEZ, but the rate of increase is unknown (Waring *et al.*, 2015).

Potential Effects of the Specified Activity on Marine Mammals

This section includes a summary and discussion of the ways that components (*i.e.*, thruster use) of the specified activity, including mitigation, may impact marine mammals and their habitat. The "Estimated Take by Incidental Harassment" section later in this document will include a quantitative analysis of the number of individuals that are expected to be taken by this activity. The "Negligible Impact Analysis" section will include the analysis of how this specific activity will impact marine mammals and will consider the content of this section, the "Estimated Take by Incidental Harassment" section and the "Proposed Mitigation" section to draw conclusions regarding the likely impacts of this activity on the reproductive success or survivorship of individuals and from that on the affected marine mammal populations or stocks.

When considering the influence of various kinds of sound on the marine environment, it is necessary to understand that different kinds of marine life are sensitive to different frequencies of sound. Based on available behavioral data, audiograms derived using auditory evoked potential techniques, anatomical modeling, and other data, NOAA's Acoustic Guidance for Assessing the Effects of Anthropogenic Sound on Marine Mammal Hearing (NMFS, 2016) designate "marine mammal hearing groups" for marine mammals and estimate the lower and upper frequencies of hearing. The groups and the associated frequencies are indicated below, but it is important to note animals are less sensitive to sounds at the outer edge of their functional range and most sensitive to sounds of frequencies within a smaller range somewhere in the middle of their functional hearing range:

• Low frequency cetaceans (13 species of mysticetes): generalized hearing range is 7 hertz (Hz) to 35 kilohertz (kHz);

• Mid-frequency cetaceans (32 species of dolphins, six species of larger toothed whales, and 19 species of beaked and bottlenose whales): generalized hearing range is 150 Hz to 160 kHz;

• High frequency cetaceans (eight species of true porpoises, six species of river dolphins, Kogia, the franciscana, and four species of cephalorhynchids): generalized hearing range is 275 Hz to 160 kHz; and

• Phocid pinnipeds in water: generalized hearing range is 50 Hz to 86 kHz; and

• Otariid pinnipeds in water: functional hearing is estimated to occur between approximately 60 Hz and 39 kHz.

As mentioned previously in this document, 14 marine mammal species (12 cetacean and two pinniped species) are likely to occur near the Port. Of the 12 cetacean species likely to occur

in Neptune's project area, five are classified as low frequency cetaceans (*i.e.,* North Atlantic right, humpback, fin, minke, and sei whales), six are classified as mid-frequency cetaceans (*i.e.*, killer and pilot whales and bottlenose, common, Risso's, and Atlantic white-sided dolphins), and one is classified as a high-frequency cetacean (*i.e.*, harbor porpoise) (Southall *et al.*, 2007). Both seal species potentially taken, by harassment, are phocids. The potential effects of the specified activity on marine mammals has been reviewed in the previous incidental take authorizations to Neptune (*e.g.*, 75 FR 80260 [December 21, 2010]) as well as those proposed for the nearby Northeast Gateway LNG Port (*e.g.*, 80 FR 72688 [November 20, 2015]).

When analyzing the auditory effects of noise exposure, it is often helpful to broadly categorize noise as either impulse or non-impulsive. Impulsive sound is typically transient, brief (less than 1 second), broadband, and consists of high peak sound pressure with rapid rise time and rapid decay. Impulsive sounds can occur in repetition or as a single event. Non-impulsive sound is characterized as broadband, narrowband, or tonal, brief or prolonged, continuous or intermittent, and does not have high peak sound pressure with rapid rise times (NMFS, 2016). Further, continuous noise is defined as a sound whose sound pressure level remains above ambient sound during the observation period (ANSI, 2005). DP vessel thrusters produce a non-impulsive, continuous noise. Marine mammals may undergo behavioral modifications rising to the level of take when exposed to elevated sound levels produced by thrusters during maneuvering of the DSV or HLV while docking and undocking and occasional weathervaning during maintenance, repair, and decommissioning activities. The potential effects of sound from thruster use include, but are not limited to, one or more of the following: no effect; masking; behavioral disturbance; non-auditory physical effects; and, temporary hearing impairment (Richardson *et al.*, 1995; Southall *et al.*, 2007). For reasons discussed later in this document, it is

unlikely that there would be any cases of temporary or permanent hearing impairment resulting from these activities. As outlined in previous NMFS documents, the effects of noise on marine mammals are highly variable and can be categorized as follows (based on Richardson *et al.*, 1995):

(1) The noise may be too weak to be heard at the location of the animal (*i.e.*, lower than the prevailing ambient noise level, the hearing threshold of the animal at relevant frequencies, or both);

(2) The noise may be audible but not strong enough to elicit any overt behavioral response;

(3) The noise may elicit reactions of variable conspicuousness and variable relevance to the well being of the marine mammal; these can range from temporary alert responses to active avoidance reactions such as vacating an area at least until the noise event ceases but potentially for longer periods of time;

(4) Upon repeated exposure, a marine mammal may exhibit diminishing responsiveness (habituation), or disturbance effects may persist; the latter is most likely with sounds that are highly variable in characteristics, infrequent, and unpredictable in occurrence, and associated with situations that a marine mammal perceives as a threat;

(5) Any anthropogenic noise that is strong enough to be heard has the potential to reduce (mask) the ability of a marine mammal to hear natural sounds at similar frequencies, including calls from conspecifics, and underwater environmental sounds such as surf noise;

(6) If mammals remain in an area because it is important for feeding, breeding, or some other biologically important purpose even though there is chronic exposure to noise, it is possible

that there could be noise-induced physiological stress; this might in turn have negative effects on the well-being or reproduction of the animals involved; and

(7) Very strong sounds have the potential to cause a temporary or permanent reduction in hearing sensitivity. In terrestrial mammals, and presumably marine mammals, received sound levels must far exceed the animal's hearing threshold for there to be any temporary threshold shift (TTS) in its hearing ability. For transient sounds, the sound level necessary to cause TTS is inversely related to the duration of the sound. Received sound levels must be even higher for there to be risk of permanent hearing impairment. In addition, intense acoustic or explosive events may cause trauma to tissues associated with organs vital for hearing, sound production, respiration and other functions. This trauma may include minor to severe hemorrhage.

Masking

Underwater noise, whether of natural or anthropogenic origin, has the ability to interfere with the way in which marine mammals receive acoustic signals used for communication, social interaction, foraging, navigation, etc. (Erbe *et al.,* 2016). When communication signals occur near the noise band of the source (in this case, a low frequency source like thrusters), communication space of marine mammals can be reduced (*e.g.,* Clark *et al.,* 2009) and those animals may exhibit increased stress levels (*e.g.,* Foote *et al.,* 2004; Holt *et al.,* 2009). Background ambient noise often interferes with or masks the ability of an animal to detect a sound signal even when that signal is above its absolute hearing threshold.

Natural ambient noise includes contributions from wind, waves, precipitation, other animals, and (at frequencies above 30 kHz) thermal noise resulting from molecular agitation (Richardson *et al.*, 1995) making the sea usually noisy, even in the absence of manmade sounds. As such, marine mammals have evolved systems and behavior that function to reduce the

impacts of masking. Structured signals, such as the echolocation click sequences of small toothed whales, may be readily detected even in the presence of strong background noise because their frequency content and temporal features usually differ strongly from those of the background noise (Au and Moore, 1988, 1990). There is evidence some toothed whales can increase amplitude and shift dominant frequencies of their echolocation and communication signals to compensate for increased ocean noise (Au *et al*., 1985; Holt *et al.*, 2011; Scheifele *et al.*, 2005). In addition, the sound localization abilities of marine mammals suggest that, if signal and noise come from different directions, masking would not be as severe as the usual types of masking studies might suggest (Richardson *et al.*, 1995).

The introduction of strong sounds into the sea at frequencies important to marine mammals increases the severity and frequency of occurrence of masking. Recent science suggests that low frequency ambient sound levels have increased by as much as 20 decibels (dB) (more than three times in terms of sound pressure level [SPL]) in the world's ocean from pre-industrial periods, and most of these increases are from distant shipping (Hildebrand, 2009).

Unlike threshold shift, masking can potentially affect the species at population, community, or even ecosystem levels, as well as individual levels. Masking affects both senders and receivers of the signals and could have long-term chronic effects on marine mammal species and populations; however, quantitative data supporting this is lacking. Regardless, Neptune's use of DP thrusters would contribute elevated noise levels, thus increasing severity of masking by nearby animals.

Disturbance

Exposure of marine mammals to certain sounds could lead to behavioral disturbance (Richardson *et al.*, 1995), such as: changing durations of surfacing and dives, number of blows

per surfacing, or moving direction and/or speed; reduced/increased vocal activities; changing/cessation of certain behavioral activities (such as socializing or feeding); visible startle response or aggressive behavior (such as tail/fluke slapping or jaw clapping); avoidance of areas where noise sources are located; and/or flight responses (*e.g.*, pinnipeds flushing into water from haulouts or rookeries).

The onset of behavioral disturbance from anthropogenic noise depends on both external factors (characteristics of noise sources and their paths) and the receiving animals (hearing, motivation, experience, demography) and is also difficult to predict (Southall *et al.*, 2007). Similarly, the biological significance of many of these behavioral disturbances, especially short-term, mild reactions, are not well documented. The consequences of behavioral modification are expected to be biologically significant if the change affects growth, survival, and/or reproduction.

Currently NMFS uses a received level of 160 dB re 1 micro Pascal (μPa) root mean square (rms) for impulse noises, which are characterized by rapid rise times (*e.g.*, impact pile driving), as the onset of marine mammal behavioral harassment, and 120 dB re 1 μPa (rms) for non-impulse noise sources (*e.g.*, DP vessel thrusters). No impulse noise is expected from activities under this IHA. For Neptune's maintenance, repair and decommissioning activities, only the 120 dB re 1 μPa (rms) threshold is considered because only non-impulse noise sources would be generated.

Hearing Impairment and Other Physiological Effects

Marine mammals exposed to high intensity sound repeatedly or for prolonged periods can experience hearing threshold shift (TS), which is the loss of hearing sensitivity at certain frequency ranges (Kastak *et al.*, 1999; Schlundt *et al.*, 2000; Finneran *et al.*, 2002; 2005). TS

can be permanent (PTS), in which case the loss of hearing sensitivity is unrecoverable, or temporary (TTS), in which case the animal's hearing threshold will recover over time (Southall *et al.*, 2007). Since marine mammals depend on acoustic cues for vital biological functions, such as orientation, communication, finding prey, and avoiding predators, marine mammals that suffer from PTS or TTS could have reduced fitness, survival, and reproduction, either permanently or temporarily.

TTS is the mildest form of hearing impairment that can occur during exposure to a strong sound (Kryter, 1985). While experiencing TTS, the hearing threshold rises and a sound must be stronger in order to be heard. At least in terrestrial mammals, TTS can last from minutes or hours to (in cases of strong TTS) days. For sound exposures at or somewhat above the TTS threshold, hearing sensitivity in both terrestrial and marine mammals recovers rapidly after exposure to the noise ends.

Human non-impulsive noise exposure guidelines are based on exposures of equal energy (the same sound exposure level [SEL]) producing equal amounts of hearing impairment regardless of how the sound energy is distributed in time (NIOSH, 1998). Until recently, previous marine mammal TTS studies have also generally supported this equal energy relationship (Southall *et al.*, 2007). Three newer studies, two by Mooney *et al.* (2009a,b) on a single bottlenose dolphin either exposed to playbacks of U.S. Navy mid-frequency active sonar or octave-band noise (4–8 kHz) and one by Kastak *et al*. (2009) on a single California sea lion exposed to airborne octave-band noise (centered at 2.5 kHz), concluded that for all noise exposure situations, the equal energy relationship may not be the best indicator to predict TTS onset levels.

TTS was measured in a single, captive bottlenose dolphin after exposure to a continuous tone with maximum SPLs at frequencies ranging from 4 to 11 kHz that were gradually increased in intensity to 179 dB re 1 µPa and in duration to 55 minutes (Nachtigall *et al.*, 2003). No threshold shifts were measured at SPLs of 165 or 171 dB re 1 µPa. However, at 179 dB re 1 µPa, TTSs greater than 10 dB were measured during different trials with exposures ranging from 47 to 54 minutes. Hearing sensitivity apparently recovered within 45 minutes after noise exposure.

For baleen whales, there are no data on levels or properties of sound that are required to induce TTS. The frequencies to which baleen whales are most sensitive are lower than those to which odontocetes are most sensitive, and natural background noise levels at those low frequencies tend to be higher. Sounds that are produced in the frequency range at which an animal hears the best do not need to be as loud as sounds in less functional frequencies to be detected by the animal. As a result, auditory thresholds of baleen whales within their frequency band of best hearing are believed to be higher (less sensitive) than are those of odontocetes at their best frequencies (Clark and Ellison, 2004). Therefore, for a sound to be audible, baleen whales require sounds to be louder (*i.e.*, higher dB levels) than odontocetes in the frequency ranges at which each group hears the best. Based on this information, it is suspected that received levels causing TTS onset may also be higher in baleen whales. Since current NMFS practice assumes the same thresholds for the onset of hearing impairment in both odontocetes and mysticetes, NMFS' onset of TTS threshold is likely conservative for mysticetes.

In free-ranging pinnipeds, TTS thresholds associated with exposure to underwater sound have not been measured; however, systematic TTS studies on captive pinnipeds have been conducted (Kastak *et al.*, 1999, 2005; Schusterman *et al.*, 2000; Southall *et al.*, 2007). Kastak et

al (1999) reported TTS of approximately 4–5 dB in three species of pinnipeds (harbor seal, Californian sea lion, and northern elephant seal) after underwater exposure for approximately 20 minutes to noise with frequencies ranging from 100-2,000 Hz at received levels 60–75 dB above hearing threshold. This approach allowed similar effective exposure conditions to each of the subjects but resulted in variable absolute exposure values depending on subject and test frequency. Recovery to near baseline levels was reported within 24 hours of noise exposure (Kastak *et al.*, 1999). Kastak *et al.* (2005) followed up on their previous work using higher sensitivity levels and longer exposure times (up to 50 minutes) and corroborated their previous findings. The sound exposures necessary to cause slight threshold shifts were also determined for two California sea lions and a juvenile elephant seal exposed to underwater sound for similar duration. The sound level necessary to cause TTS in pinnipeds depends on exposure duration, as in other mammals; with longer exposure, the level necessary to elicit TTS is reduced (Schusterman *et al.*, 2000; Kastak *et al.*, 2005). For very short exposures (*e.g.*, to a single sound pulse), the level necessary to cause TTS is very high (Finneran *et al.*, 2002).

Vessel Strikes

Vessel strikes pose a substantial risk to large whales, with North Atlantic right whales being particularly susceptible due to its congregations and movements in and around shipping lanes, near-shore behaviors, and time spent at the surface (Nowacek *et al.*, 2004). Ship strikes of cetaceans can cause major wounds, which may lead to the death of the animal. An animal at the surface could be struck directly by a vessel, a surfacing animal could hit the bottom of a vessel, or an animal just below the surface could be cut by a vessel's propeller. The severity of injuries typically depends on the size and speed of the vessel (Knowlton and Kraus, 2001; Laist *et al.*, 2001; Vanderlaan and Taggart, 2007). The most vulnerable marine mammals are those that

spend extended periods of time at the surface in order to restore oxygen levels within their tissues after deep dives (*e.g.,* the sperm whale). In addition, some baleen whales, such as the North Atlantic right whale, seem generally unresponsive to vessel sound, making them more susceptible to vessel collisions (Nowacek *et al*., 2004). These species are primarily large, slow moving whales. Smaller marine mammals (*e.g.,* bottlenose dolphin) move quickly through the water column and are often seen riding the bow wave of large ships. Marine mammal responses to vessels may include avoidance and changes in dive pattern (NRC, 2003).

In an effort to reduce right whale strikes, NMFS issued a Final Rule to reduce the severity and likelihood of vessel strikes to North Atlantic right whales, which went into effect on December 9, 2008 (73 FR 60173 [October 10, 2008]). The U.S. Northeast Great South Channel Mandatory Speed Restriction Seasonal Management Area is active April1 through July 31, annually. All Neptune vessels would abide by the speed, monitoring, and reporting restrictions contained within the Rule, including reducing vessel speed to 10 knots while in a seasonal management area and traffic scheme restrictions.

Potential Effects on Marine Mammal Habitat

The proposed action area is inhabited by North Atlantic right, fin, humpback, and minke whales during part of the seasons, and is adjacent to the Stellwagen Bank NMS. In January 2016, NMFS issued a final rule modifying North Atlantic right whale critical habitat. As a result of that modification, the Port is now located within right whale critical habitat.

Loss or modification of marine mammal habitat could arise from maintenance, repair, and decommissioning activities by altering benthic habitat, degrading water quality, and introduction of noise. Short-term impacts on benthic communities will occur during the decommissioning and removal or abandonment of Neptune DWP components at the north and south buoys and hot tap.

Proposed activities will temporarily disturb small localized areas around each installed component slated for removal. Activities will produce suspension of fine sediments and resettlement of suspended sediments is the area immediately adjacent to ongoing operations. Resettlement of suspended sediments will produce localized reductions in benthic growth, reproduction, and survival rates of indigenous fauna; if the sediment resettlement is significant, smothering of benthic flora and fauna may occur.

Maintenance, repair, and decommissioning is also likely to cause disturbance of the seafloor and increase turbidity. Sediment transport modeling conducted by Neptune on construction procedures indicated that initial turbidity from installation of the pipeline could reach 100 milligrams per liter (mg/L), but will subside to 20 mg/L after 4 hours. Turbidity associated with the flowline and hot-tap will be considerably less and also will settle within hours of the work being completed. Marine mammals could be indirectly affected if benthic prey species were displaced or destroyed by repair activities; however, these impacts would be brief and rebound when decommissioning is complete. Therefore, NMFS has preliminarily determined any impacts from Neptune's maintenance, repair, and decommissioning activities to marine mammal habitat are not expected to cause significant or long-term consequences for individual marine mammals or populations.

Proposed Mitigation

In order to issue an incidental take authorization (ITA) under sections 101(a)(5)(A) and (D) of the MMPA, NMFS must, where applicable, set forth the permissible methods of taking pursuant to such activity, and other means of effecting the least practicable impact on such species or stock and its habitat, paying particular attention to rookeries, mating grounds, and

areas of similar significance, and on the availability of such species or stock for taking for certain subsistence uses (where relevant).

Neptune submitted a "Monitoring and Mitigation Plan for Neptune Deepwater LNG Port Maintenance, Repair, and Decommissioning (MMDMP)" as part of its MMPA application (Appendix A of the application; see ADDRESSES). The MMDMP will provide the framework for mitigation and monitoring during the proposed activities. These measures include the following components: (1) visual and acoustic monitoring program; (2) safety/shutdown zones; (3) recording and reporting; and (4) vessel speed/area restrictions.

The mitigation protocols have been designed to provide both protection to marine mammals from exposure to the highest noise levels and contributions to noise characterization and species for the region. The mitigation measures will reduce the impact to marine mammals by minimizing exposure to potentially disruptive noise levels. The mitigation measures will further reduce any potential ship strikes to large whales in the area. The measures, which include use of protected species observers on all DP vessels, mitigation zones, and vessel speed reductions, are described below. If Neptune has to take action (*e.g.,* cease vessel movement, power down thrusters), the activity may resume after the marine mammal is positively reconfirmed outside the established zones or if the marine mammal has not been re-sighted in the established zones for 30 minutes.

Mitigation Measures

1. Any whale visually sighted or otherwise detected (*e.g.,* on the Navigational Telex (NAVTEX), NOAA Weather Radio, NOAA Right Whale Sighting Advisory System (SAS)) within 1,000 m of a vessel shall result in a heightened alert status which will

require all project vessels to operate at slow speeds of 4-knots or less and any non-critical departure plans to be delayed.

2. If a right whale call is confirmed on the two closest passive acoustic monitoring (PAM) buoys or on any three PAM buoys, all vessels will go into heightened alert status requiring all project vessels to operate at slow speeds of 4 knots or less and any non-critical departure plans to be delayed.

3. Any whale sighted within or approaching 500 m of a vessel shall result in that vessel using idle speed and/or ceasing all movement. If the vessel is operating DP thrusters, the thrusters will be shut down or reduced to minimal safe operating power. The speed and activity restrictions shall continue until either the observed whale has been confirmed outside of and on a path away from 500m from the vessel or 30 minutes have passed without another confirmed detection.

4. Any non-whale marine mammal species detected within or approaching 100 m of a vessel shall result in that vessel using idle speed and/or ceasing all movement. If the vessel is operating DP thrusters, the thrusters will be shut down or reduced to minimal safe operating power. The speed and activity restrictions shall continue until either the observed marine mammal has been confirmed outside and on a path away from 100 m from the activity or 30 minutes have passed without another confirmed detection.

5. All project vessels will remain at least 500 m away from any North Atlantic right whale and at least 100 m away from all other marine mammals. If a marine mammal approaches a stationary vessel, that vessel will sit idle or turn off engines until the marine mammal has left the designated zone or 30 minutes have passed without another confirmed detection.

6. All vessels shall utilize the International Maritime Organization (IMO)-approved Boston Traffic Separation Scheme (TSS) on their approach to and departure from the Neptune DWP and/or the unscheduled maintenance/maintenance area at the earliest practicable point of transit in order to avoid the risk of whale strikes.

7. Repair vessels, DSVs, and HLVs, will transit at 10 knots (18.5 km/hr) or less in the following seasons and areas, which either correspond to or are more restrictive than the times and areas in NMFS' final rule (73 FR 60173 [October 10, 2008]) to implement speed restrictions to reduce the likelihood and severity of ship strikes of right whales:

- CCB Seasonal Management Area (SMA) from January 1 through May 15, which includes all waters in CCB, extending to all shorelines of the Bay, with a northern boundary of 42° 12' N. latitude;
- Off Race Point SMA year round, which is bounded by straight lines connecting the following coordinates in the order stated: 42° 30' N. 69° 45' W.; thence to 42° 30' N. 70° 30' W.; thence to 42° 12' N. 70° 30' W.; thence to 42° 12' N. 70° 12' W.; thence to 42° 04' 56.5'' N. 70° 12' W.; thence along mean high water line and inshore limits of COLREGS[1] limit to a latitude of 41° 40' N.; thence due east to 41° 41' N. 69° 45' W.; thence back to starting point; and
- Great South Channel (GSC) SMA from April 1 through July 31, which is bounded by straight lines connecting the following coordinates in the order stated:

  42° 30' N. 69° 45' W.

  41° 40' N. 69° 45' W.

[1] The International Regulations for Preventing Collisions at Sea 1972 (COLREGS) are published by the International Maritime Organization (IMO) and set out, among other things, the "rules of the road" or navigation rules to be followed by ships and other vessels at sea to prevent collisions between two or more vessels.

41° 00' N. 69° 05' W.

42° 09' N. 67° 08' 24'' W.

42° 30' N. 67° 27' W.

42° 30' N. 69° 45' W.

8. All vessels transiting to and from the project area shall report their activities to the mandatory reporting Section of the USCG to remain apprised of North Atlantic right whale movements within the area. All vessels entering and exiting the Mandatory Ship Reporting Area (MSRA) shall report their activities to WHALESNORTH. Vessel operators shall contact the USCG by standard procedures promulgated through the Notice to Mariner system. Information regarding the geographical boundaries and reporting details can be found at: http://www.fisheries.noaa.gov/pr/shipstrike/msr.htm

9. Prior to leaving the dock to begin transit, the project vessel must contact one of the PSOs on watch to receive an update of sightings within the visual observation area. If the PSO has observed a North Atlantic right whale within 30 minutes of the transit start, the vessel will hold for 30 minutes and again get a clearance to leave from the PSOs on board. PSOs will assess whale activity and visual observation ability at the time of the transit request to clear the barge for release.

10. No vessels will transit from shore to the project site during nighttime or when visibility is reduced below 1,000 m, unless an emergency situation requires the vessel to transit during those times. Should transit at night be required, the maximum speed will be 5 knots (9.3 km/hr).

11. All vessels will consult NAVTEX, NOAA Weather Radio, the NOAA Right Whale SAS or other means to obtain current large whale sighting information.

12. If member of the crew visually detects a marine mammal within the ZOI (3.45 km), they will alert the lead PSO on watch who shall then relay the sighting information to the other vessels to document take, determine if mitigation actions are necessary, as required by this IHA, and ensure action(s) can be taken to avoid physical contact with marine mammals.

13. In response to any whale sightings or acoustic detections, and taking into account exceptional circumstances, all vessels shall actively communicate with the PSO(s) on watch and will take appropriate actions to minimize the risk of striking whales.

14. Neptune must immediately suspend any repair, maintenance, or decommissioning activities if a dead or injured marine mammal is found in the vicinity of the project area, and the death or injury of the animal could be attributable to the LNG facility activities. Neptune must contact NMFS and the Greater Atlantic Regional Office (GARFO) Marine Mammal Stranding and Disentanglement Program. Activities will not resume until review and approval has been given by NMFS.

15. Use of lights during repair or maintenance activities shall be limited to areas where work is actually occurring, and all other lights must be extinguished. Lights must be downshielded to illuminate the deck and shall not intentionally illuminate surrounding waters, so as not to attract whales or their prey to the area.

16. Transit route, destination, sea conditions and any marine mammal sightings/mitigation actions during watch shall be recorded in the log book.

17. The material barges and tugs used in repair and maintenance shall transit from the operations dock to the work sites during daylight hours when possible provided the safety

of the vessels is not compromised. Should transit at night be required, the maximum speed of the tug shall be five knots.

18. All repair vessels must maintain a speed of 10 knots or less during daylight hours. All vessels shall operate at five knots or less at all times within five km of the maintenance, repair, or decommissioning area.

19. All decommissioning work will occur during the May 1 to November 30 seasonal window so that disturbance to North Atlantic right whales will be largely avoided.

Mitigation Conclusions

NMFS has carefully evaluated the applicant's proposed mitigation measures and considered a range of other measures in the context of ensuring that NMFS prescribes the means of effecting the least practicable impact on the affected marine mammal species and stocks and their habitat. Our evaluation of potential measures included consideration of the following factors in relation to one another:

- The manner in which, and the degree to which, the successful implementation of the measure is expected to minimize adverse impacts to marine mammals;
- The proven or likely efficacy of the specific measure to minimize adverse impacts as planned; and
- The practicability of the measure for applicant implementation.

Any mitigation measure(s) prescribed by NMFS should be able to accomplish, have a reasonable likelihood of accomplishing (based on current science), or contribute to the accomplishment of one or more of the general goals listed below:

1. Avoidance or minimization of injury or death of marine mammals wherever possible (goals 2, 3, and 4 may contribute to this goal);

2. A reduction in the numbers of marine mammals (total number or number at biologically important time or location) exposed to received levels of DP vessel thrusters, or other activities expected to result in the take of marine mammals (this goal may contribute to 1, above, or to reducing harassment takes only);

3. A reduction in the number of times (total number or number at biologically important time or location) individuals would be exposed to received levels of DP vessel thrusters, or other activities expected to result in the take of marine mammals (this goal may contribute to 1, above, or to reducing harassment takes only);

4. A reduction in the intensity of exposures (either total number or number at biologically important time or location) to received levels of DP vessel thrusters, or other activities expected to result in the take of marine mammals (this goal may contribute to a, above, or to reducing the severity of harassment takes only);

5. Avoidance or minimization of adverse effects to marine mammal habitat, paying special attention to the food base, activities that block or limit passage to or from biologically important areas, permanent destruction of habitat, or temporary destruction/disturbance of habitat during a biologically important time; and

6. For monitoring directly related to mitigation – an increase in the probability of detecting marine mammals, thus allowing for more effective implementation of the mitigation.

Proposed Monitoring and Reporting

In order to issue an ITA for an activity, section 101(a)(5)(D) of the MMPA states that NMFS must set forth, "requirements pertaining to the monitoring and reporting of such taking." The MMPA implementing regulations at 50 CFR 216.104 (a)(13) indicate that requests for ITAs must include the suggested means of accomplishing the necessary monitoring and reporting that will result in increased knowledge of the species and of the level of taking or impacts on populations of marine mammals that are expected to be present in the proposed action area. Neptune submitted a marine mammal monitoring plan as part of the IHA application (see Appendix A of the application). The plan may be modified or supplemented based on comments or new information received from the public during the public comment period.

Summary of Marine Mammal Monitoring Reports

NMFS reviewed Neptune's marine mammal monitoring report submitted as a requirement of their LOA covering July 2011 to July 2016. During the five-year period, the Port was operational between April 2010, and July 12, 2011; however, no SRVs visited the Port. As such, no marine mammal monitoring occurred. Between July 6-17, 2011, Neptune performed repair activities at the north buoy. During the repair work, four PSOs kept 24-hour watch for marine mammals and sea turtles. There were 24 marine mammal sightings comprising four species: minke whales (n= 9), fin whales (n=2), humpback whales (n=5), short-beaked common dolphins (n=2), and harbor porpoise (n=1). In addition, three sightings of an unidentified cetacean and one sighting of an unidentified seal occurred. In total, 171 individuals were sighted with the majority (n = 135) being common dolphins. Two fin whales traveling together and approximately 130 common dolphins entered the 100 yard mitigation zone while thrusters were in use. On both occasions, divers were in the water and changes to thruster activity or power would endanger those divers or property. NMFS notes that the 100 yard mitigation zone did not

constitute a Level A take area (due to source power at 1 meter being equal or less than the 180 dB re 1 μPa (rms) Level A threshold criterion that was in place during the authorization period) but was enacted to decrease elevated noise exposure. Therefore, Neptune did not take a marine mammal in a manner not authorized by their LOA. After July 17, 2011, there were no port activities; therefore, no marine mammal monitoring was conducted.

Monitoring measures prescribed by NMFS should accomplish one or more of the following general goals:

1. An increase in the probability of detecting marine mammals, both within the mitigation zone (thus allowing for more effective implementation of the mitigation) and in general to generate more data to contribute to the analyses mentioned below;

2. An increase in our understanding of how many marine mammals are likely to be exposed to levels of thruster noise we associate with specific adverse effects, such as behavioral harassment, TTS, or PTS;

3. An increase in our understanding of how marine mammals respond to stimuli expected to result in take and how anticipated adverse effects on individuals (in different ways and to varying degrees) may impact the population, species, or stock (specifically through effects on annual rates of recruitment or survival) through any of the following methods:

- Behavioral observations in the presence of stimuli compared to observations in the absence of stimuli (need to be able to accurately predict received level, distance from source, and other pertinent information);
- Physiological measurements in the presence of stimuli compared to observations in the absence of stimuli (need to be able to accurately predict received level, distance from source, and other pertinent information);

- Distribution and/or abundance comparisons in times or areas with concentrated stimuli versus times or areas without stimuli;

4. An increased knowledge of the affected species; and

5. An increase in our understanding of the effectiveness of certain mitigation and monitoring measures.

The following describes Neptune's proposed monitoring plan components. The monitoring efforts would support the proposed mitigation actions described above.

Visual Monitoring

1. All vessel crew members will undergo environmental training. Crew members who will act as designated watch personnel during heightened awareness conditions (whale within 1,000 m) will receive specialized observer training.

2. All vessel operation requirements, guidelines and mitigation requirements will be clearly posted on the bridge of all project vessels.

3. Neptune or its contractor shall provide a half-day training course to designated crew members assigned to the transit barges and other support vessels. This course shall cover topics including, but not limited to, descriptions of the marine mammals found in the area, mitigation and monitoring requirements contained in this Authorization, sighting log requirements, and procedures for reporting injured or dead marine mammals. These designated crew members shall be required to keep watch on the bridge and immediately notify the navigator of any whale sightings. All watch crew shall sign into a bridge log book upon start and end of watch. Transit route, destination, sea conditions, and any protected species sightings/mitigation actions during watch shall be recorded in the log book.

4. Each DP vessel will employ three professional PSOs. Two PSOs will conduct continual visual watches on a shift basis during all daylight hours. The third PSO will stand night watch. Daytime PSOs will monitor the acoustic alert program when not on active visual watch. During the night, one PSO will monitor the acoustic alert program and will scan the area around the vessel using a thermal imaging or similar enhancement device for 15 minutes each hour.

5. All professional PSOs will be approved by NMFS prior to the start of the project, will have at least one full year of marine mammal observation experience in the U.S. Atlantic, Pacific or Gulf of Mexico, and will have experience in acoustic monitoring and baleen whale detection.

6. Each non-DP vessel will designate one trained crew member to stand a dedicated watch during all vessel movement and during times of heightened awareness. All designated crew watch personnel will undergo a full day of project-specific mitigation and monitoring training alongside the professional PSOs.

7. PSOs will be responsible for advising vessel crew members on the required operating procedures and mitigation measures that are defined in the IHA. PSOs will be responsible for providing the required observation and detection data during the decommissioning activities.

Acoustic Monitoring

As a requirement of previous incidental take authorizations issued to Neptune, a passive acoustic monitoring array was installed around the project area and Boston Traffic Separation Scheme (TSS) to supplement visual monitoring and provide additional information regarding use of the area by marine mammals. This network consists of 19 autonomous recording units (ARUs) and near-real-time acoustic buoys. Neptune shall maintain a passive acoustic

monitoring array consisting of four near real-time ARUs strategically placed around the north and south buoys for the life of the IHA to monitor for whale calls and record and analyze background and project-related noise levels. The location of the buoys is strategic to cover part of the Boston TSS, and the Neptune project area. Because no vessels will be coming from offshore, the remaining offshore buoys have been removed.

The PAM buoys continuously record and analyze underwater sounds, including calling whales, throughout the entirety of the deployment period. The buoys can be operated in real time when bandwidth allows periodic transfer of data, or buoys can operate using auto-detection capabilities. When the onboard software detects a whale call, the buoy sends the spectral data for the detected signal via radio link to a computer display or handheld device that is monitored by the PSO on duty. If a detection alert is received, the PSO will review the data and confirm that the signal is a whale call. Upon verification, the PSO will monitor the other buoys for call detections. If the PSO verifies detections from the next closest buoy or two other buoys, then vessels will go into "heightened awareness" mode. Mitigation measures for acoustic detection of whales will be the same as those for visual detection described in the "Proposed Mitigation" section above. Additionally, upon acoustic confirmation of a North Atlantic right whale within 1000 m of the project site, all vessel captains will be immediately notified, crew PSOs will stand watch, vessel speeds will be reduced, transits will be delayed unless crew safety is compromised, and the area will be visually and acoustically monitored until the PSO determines that normal operating procedures can be resumed. Acoustic monitoring will be conducted at night to substitute visual monitoring not allowed for by thermal imaging or similar enhancement device.

Reporting Measures

Since the Port is within the MSRA, all vessels transiting to and from Neptune shall report their activities to the mandatory reporting section of the USCG to remain apprised of North Atlantic right whale movements within the area. All vessels entering and exiting the MSRA shall report their activities to USCG's northeast whale reporting system (WHALESNORTH). Vessel operators shall contact the USCG by standard procedures promulgated through the Notice to Mariner system.

During all phases of project construction, sightings of any injured or dead marine mammals will be reported immediately to the USCG and NMFS, regardless of whether the injury or death is caused by project activities. Sightings of injured or dead marine mammals not associated with project activities can be reported to the USCG on VHF Channel 16 or to NMFS GARFO Marine Mammal Stranding and Disentanglement Program. In addition, if the injury or death was caused by a project vessel (*e.g.*, DSV, HLV, tug, support vessel, etc.), the USCG must be notified immediately, and a full incident report must be provided to NMFS, Greater Atlantic Regional Fisheries Office (GARFO). The report must include the following information: (1) the time, date, and location (latitude/longitude) of the incident; (2) the name and type of vessel involved; (3) the vessel's speed during the incident; (4) a description of the incident; (5) water depth; (6) environmental conditions (*e.g.*, wind speed and direction, sea state, cloud cover, and visibility); (7) the species identification or description of the animal; (8) the fate of the animal; and (9) photographs or video footage of the animal (if equipment is available).

Neptune must submit an annual report on marine mammal monitoring and mitigation actions taken or not taken to the NMFS Office of Protected Resources and GARFO within 90 days after the expiration of the IHA. The annual report should include data collected for each distinct marine mammal species observed in the project area in the Massachusetts Bay during the

period of LNG facility construction and operations. Description of marine mammal behavior, numbers of individuals observed, frequency of observation, and any behavioral changes and the context of the changes relative to construction and operation activities shall also be included in the annual report. Additional information that will be recorded during construction and contained in the reports include: date and time of marine mammal detections (visually or acoustically), weather conditions, species identification, approximate distance from the source, activity of the vessel or at the construction site when a marine mammal is sighted, and whether thrusters were in use and, if so, how many at the time of the sighting and energy level.

In the event that Neptune discovers an injured or dead marine mammal, and the lead PSO determines that the injury or death is not associated with or related to the activities authorized (if the IHA is issued) (*e.g.*, previously wounded animal, carcass with moderate to advanced decomposition, or scavenger damage), Neptune shall report the incident to the Chief, Permits and Conservation Division, Office of Protected Resources, NMFS, and the NMFS Northeast Marine Mammal Stranding Coordinators within 24 hours of the discovery. Neptune shall provide photographs or video footage (if available) or other documentation of the stranded animal sighting to NMFS and the GARFO Marine Mammal Stranding and Disentanglement Program. Neptune can continue its operations under such a case.

General Conclusions Drawn from Previous Monitoring Reports

Neptune has submitted numerous reports, including weekly reports during port construction, to NMFS as required by previous IHAs and the 2011-2016 LOA. While it is difficult to draw biological conclusions from these reports, NMFS can make some general conclusions. Data gathered by PSOs is generally useful to indicate the presence or absence of marine mammals (often to a species level) within the safety zones (and sometimes without) and

to document the implementation of mitigation measures. Though it is by no means conclusory, it is worth noting that no instances of obvious behavioral disturbance as a result of Neptune's activities were documented by PSOs.

Estimated Take by Incidental Harassment

Except with respect to certain activities not pertinent here, the MMPA defines "harassment" as: any act of pursuit, torment, or annoyance which (i) has the potential to injure a marine mammal or marine mammal stock in the wild (Level A harassment); or (ii) has the potential to disturb a marine mammal or marine mammal stock in the wild by causing disruption of behavioral patterns, including, but not limited to, migration, breathing, nursing, breeding, feeding, or sheltering (Level B harassment). Only take by Level B harassment is anticipated as a result of Neptune's use of DP vessel thrusters during maintenance, repair, and decommissioning activities. Additionally, vessel strikes are not anticipated because of the monitoring and mitigation measures described earlier in this document.

Decommissioning and Maintenance Sound

Acoustic modeling and *in situ* measurements using a version of the Range Dependent Acoustic Model (RAM) were conducted for issuance of Neptune's previous IHAs and LOA. The noise fields utilized to assess construction (pipelaying) scenarios used a surrogate, multi-vessel activity scenario which included the Castoro II lay barge, two tugs, one DP survey vessel working on the flowline between the North and South buoys, and SRVs to access the DWP (Laurinolli *et al.*, 2005). DP vessels similar to the DSV or HLV used for maintenance and decommissiong were not included in this model. Because the SRVs used for construction and operation are larger and employ greater horsepower than the vessels to be used during maintenance, repair and decommissioning, thruster noise from DP vessels used under this IHA is

less than that generated from SRVs. Modeling results showed broadband source level for an SRV is 180 dB re 1 μPa (rms) while modeled broadband source level for a proxy DSV and HLV is 177.9 dB re 1 μPa (rms). Neptune used this 177.9 dB re 1 μPa (rms) source level to determine distances to the 120 dB re 1 μPa (rms) isopleth and calculate associated ZOI.

Neptune calculated the ensonified area in which a marine mammal anywhere in the water column could potentially be exposed to a 120 dB re 1 μPa (rms) sound pressure level. Thruster use would occur at three locations: the north buoy, south buoy and hot tap. The north and south buoys are located in areas with similar characteristics (*e.g.,* water depth, substrate type) which should result in similar transmission loss rates while the hot tap is located in shallower waters. Therefore, Neptune modeled transmission loss at the south buoy and hot tap which resulted in a 3.45 km and 3.12 km distance to the 120 dB re 1 μPa (rms) isopleth, respectively. Calculating for area, this equals a ZOI of 37.4 km^2 and 31 km^2 at the south buoy and hot tap, respectively. Because the number of days working at the hot tap is unknown, Neptune conservatively calculated the amount of take of marine mammals based on transmission loss rates at the south buoy (ZOI = 37.4 km^2) for the full 70 days of decommissioning work and allowed for two weeks of unscheduled maintenance and repair.

For continuous sounds, such as those produced by Neptune's specified activity (*i.e.,* thrusters), NMFS uses a received level of 120 dB re 1 μPa (rms) to indicate the onset of potential for Level B harassment. Neptune's take estimates were derived by applying the modeled zone of influence (ZOI; *e.g.*, the area ensonified by the 120 dB re 1 μPa (rms) contour) at the south buoy to the highest seasonal use (density) of the area by marine mammals and estimated duration of maintenance, repair, and decommissioning activities. The take estimates provided in Neptune's application are likely an overestimate of actual take for the following reasons: Neptune is

applying the larger ZOI for all activities despite that some maintenance, repair, and decommissioning activities will occur at the hot tap/transfer manifold which is located in shallower water and is modeled to have a smaller zone of influence than the south buoy (3.12 km vs 3.45 km), summer marine mammal densities are used to calculate take; however, some activities may occur outside of the summer months when densities are lower, maintenance activities are not currently planned but two weeks of work is included here as a precaution for unexpected equipment malfunction prior to decommissioning, and the take estimates do not take into consideration the mitigation and monitoring measures that are proposed for inclusion in the IHA, if issued. Because some components of the project are unknown (*e.g.*, days at hot tap vs days at south buoy; number of work days outside of peak summer abundance), NMFS is preliminarily accepting of these conservative estimates and is proposing to issue the requested amount of take.

Acoustic propagation modeling for the proposed activity was completed using a version of the RAM. This model considers range and depth along with seasonal sound velocity and geoacoustic properties of the seafloor. Frequency dependence of the sound propagation characteristics was treated by computing acoustic transmission loss at the center frequencies of all 1/3 octave bands between 10 Hz and 2 kHz. Received sound pressure levels in each band were computed by applying frequency-dependent transmission losses to the corresponding 1/3 octave band source levels. The highest 1/3 octave band level at each interval was used as the received level at that range. In order to extrapolate ZOI spatial extent, the range to each threshold was also analyzed to determine the 95^{th} percentile radius for each noise threshold level. More information on the modeling methodology can be found in Neptune's application (SEE

ADDRESSES). Neptune concluded distance to the 120 dB re 1 μPa (rms) isopleth at the south buoy extends 1.9 nautical miles (3.45 km) resulting in a ZOI of 37.4 km^2.

The density calculation methodology applied to take estimates for this application is derived from the model results produced by Roberts *et al.* (2016) for the east coast region. These files are available as raster files from the NOAA website: http://seamap.env.duke.edu/models/Duke-EC-GOM-2015/. In order to determine cetacean densities for take estimates, the grid cells that included the ZOI for the hot tap, north, and south buoys were selected for months 5 through 10 (May- October). The estimated mean monthly abundance for each species for each month was an average of May to October grid cells. Monthly values were not available for some species (*e.g.*, killer whale, blue whale); therefore, only the single value available is presented here. Estimates provided by the models are based on a grid cell size of 100 km^2; therefore, model grid cell values were divided by 100 to determine animals km^{-2}. Gray seal and harbor seal densities are not provided in the Roberts *et al.* (2016) models. Seal densities were derived from the Strategic Environmental Research and Development Program (SERDP) using the Navy Oparea Density Estimate (NODE) model for the Northeast Opareas (Best *et al.*, 2102). Densities for those species potentially taken by the specified activity are provided in Table 2 below.

Take estimates were derived using the following calculation: T = D x ZOI x 84 days where T is equal to take and D is equal to density. As a review, the ZOI is 37.4 km^2 based on distance to the 120 dB re 1 μPa (rms) at the south buoy while 84 days constitutes 70 days of decommissioning work and 14 days of unscheduled maintenance. Proposed take numbers, by species, is provided in Table 2.

Table 2. Estimated take of marine mammals, by species, incidental to the specified

activity.

Species	Estimated population (Waring *et al.*, 2015)	Density	Estimated Takes	% Population
North Atlantic right whale (*Eubalaena glacialis*)	476	0.000017	2	0.21
Fin whale (*Balaenoptera physalus*)	1,618	0.0034	12	0.12
Humpback whale (*Megaptera novaeangliae*)	823	0.0032	10	0.22
Minke whale (*Balaenoptera acutorostrata*)	20,741	0.0033	11	0.009
Sei whale (*Balaenoptera borealis*)	357	0.000036	2	0.28
Atlantic white-sided dolphin (*Lagenorhynchus acutus*)	48,819	0.039	124	0.043
Long-finned pilot whale (*Globicephala melas*)	26,535	0.0019	8	0.035
Harbor porpoise (*Phocoena phocoena*)	79,883	0.104	328	0.068
Bottlenose dolphin (*Tursiops truncatus*)	77,532	0.003	10	0.002
Short beaked common dolphin (*Delphinus delphis)*	173,486	0.0071	270*	0.002
Risso's dolphin (*Grampus griseus*)	18,250	0.000044	2	0.005
Killer whale (*Orcinus orca*)	unk	0.0000089	2	Insufficient data
Harbor seal (*Phoca vitulina*)	75,834	0.097	305	0.067
Gray sea (*Halichoerus grypus*)	unk	0.027	1586	0.002

*Although the take methodology results in an estimated take of 23 common dolphins, this species travels in large aggregations. Therefore, NMFS is proposing to authorize take based on two encounters of a group size documented within the ZOI in Neptune's monitoring reports (*i.e.,* 135 x 2).

Analysis and Preliminary Determination

Negligible Impact

NMFS has defined "negligible impact" in 50 CFR 216.103 as "an impact resulting from the specified activity that cannot be reasonably expected to, and is not reasonably likely to, adversely affect the species or stock through effects on annual rates of recruitment or survival." In making a negligible impact determination, NMFS considers a variety of factors, including but not limited to: (1) the number of anticipated mortalities; (2) the number and nature of anticipated

injuries; (3) the number, nature, intensity, and duration of Level B harassment; and (4) the context in which the takes occur.

No injuries or mortalities are anticipated to occur as a result of Neptune's proposed port maintenance, repair, and decommissioning activities, and none are proposed to be authorized by NMFS. Animals in the area are not anticipated to incur any permanent hearing impairment (*i.e.,* PTS) due to low source levels. The IHA would be conditioned to minimize the risk of vessel strike (see "Mitigation Measures") including, but not limited to, reduced vessel speed and delaying transit if whales are detected within or visibility is less than 1,000 m.

Many animals perform vital functions, such as feeding, resting, traveling, and socializing, on a diel cycle (24-hr cycle). Behavioral reactions to noise exposure (such as disruption of critical life functions, displacement, or avoidance of important habitat) are more likely to be significant if they last more than one diel cycle or recur on subsequent days (Southall *et al.*, 2007). Consequently, a behavioral response lasting less than one day and not recurring on subsequent days is not considered particularly severe unless it could directly affect reproduction or survival (Southall *et al.*, 2007). DP-thrusters may operate on consecutive days; however, NMFS does not anticipate a marine mammal to remain stationary such that it would be exposed to DP-thruster noise over multiple days. The intensity and nature of any incidental takes occurring from DP vessel thruster use is believed to be mild to moderate. The most likely effect from the action is localized, short-term behavioral disturbance from animals may avoid the area (and therefore avoid exposure) and some masking will likely occur; however, the implementation of the mitigation measures are intended to decrease these effects.

As stated previously, NMFS' practice has been to apply the 120 dB re 1 μPa (rms) received level threshold for underwater continuous sound levels to determine whether take by

Level B harassment occurs; however, not all animals react to sounds at this low level, and many will not show strong reactions (and in some cases any reaction) until sounds are much stronger. Southall *et al.* (2007) provide a severity scale for ranking observed behavioral responses of both freeranging marine mammals and laboratory subjects to various types of anthropogenic sound (see Table 4 in Southall *et al.* (2007)). Tables 15, 17, 19, and 21 in Southall *et al.* (2007) outline the numbers of low-frequency, mid-frequency, and high-frequency cetaceans and pinnipeds in water, respectively, reported as having behavioral responses to non-pulses in 10-dB received level increments. These tables illustrate, especially for cetaceans, more intense observed behavioral responses did not occur until sounds were higher than 120 dB re 1 μPa (rms). Many of the animals had no observable response at all when exposed to anthropogenic sound at levels of 120 dB re 1 μPa (rms) or higher.

Potential impacts to marine mammal habitat were discussed previously in this document (see the "Anticipated Effects on Habitat" section). Although some disturbance is possible to food sources of marine mammals, the impacts are anticipated to be minor enough as to not affect annual rates of recruitment or survival of marine mammals in the area. Based on available habitat not impacted by the activity where feeding by marine mammals occurs versus the localized area of the maintenance, repair, and decommissioning activities, any missed feeding opportunities in the direct project area would be minor based on the fact that other feeding areas exist elsewhere.

Taking into account the mitigation measures that are planned, effects on marine mammals are generally expected to be restricted to avoidance of a limited area around the Port and short-term changes in behavior, falling within the MMPA definition of "Level B harassment." Mitigation measures would include minimizing harassment by powering down

thrusters under certain conditions and three PSOs would be on-board each DP vessel to implement these measures. Based on the analysis contained herein of the likely effects of the specified activity on marine mammals and their habitat, and taking into consideration the implementation of the required monitoring and mitigation measures, NMFS preliminarily finds that the total take of marine mammals from thruster use during Port maintenance, repair, and decommissioning will have a negligible impact on the affected marine mammal species or stocks.

Small Numbers Analysis

As shown in Table 2, the percent of any marine mammal stock potentially taken by the specific activity is less than one percent, and Massachusetts Bay represents only a small fraction of the western North Atlantic basin where these animals occur. In addition, the take estimates include two weeks of maintenance and repair work that is currently not scheduled and may not occur prior to decommissioning. Based on the analysis contained herein of the likely effects of the specified activity on marine mammals and taking into consideration the implementation of the mitigation and monitoring measures, we preliminarily find that small numbers of marine mammals will be taken relative to the populations of the affected species or stocks.

Impact on Availability of Affected Species or Stock for Taking for Subsistence Uses

There are no relevant subsistence uses of marine mammals implicated by this action. Therefore, we have determined that the total taking of affected species or stocks would not have an unmitigable adverse impact on the availability of such species or stocks for taking for subsistence purposes.

Endangered Species Act (ESA)

On January 12, 2007, NMFS concluded consultation with MARAD and USCG under section 7 of the ESA on the proposed construction and operation of the Port and issued a Biological Opinion. The finding of that consultation was that the construction and operation of the Port may adversely affect, but is not likely to jeopardize, the continued existence of northern right, humpback, and fin whales, and is not likely to adversely affect sperm, sei, or blue whales and Kemp's ridley, loggerhead, green, or leatherback sea turtles.

On March 2, 2010, MARAD and USCG sent a letter to NMFS requesting reinitiation of the section 7 consultation. MARAD and USCG determined that certain routine planned operations and maintenance activities, inspections, surveys, and unplanned repair work on the Port pipelines and flowlines, as well as any other Port component (including buoys, risers/umbilicals, mooring systems, and sub-sea manifolds), may constitute a modification not previously considered in the 2007 Biological Opinion. Decommissioning is addressed as one of the activities in the NOAA Biological Opinion for MARAD's issuance of a license for Neptune to own and operate the Port (dated July 12, 2010).

On January 27, 2016, NMFS published a rule in the Federal Register expanding critical habitat for the North Atlantic right whale (81 FR 4838). This expansion incorporates the Port which was previously not within designated critical habitat. As such, NMFS is pursuing informal consultation with the Greater Atlantic Regional Office and will conclude all ESA consultation requirements prior to issuing the proposed IHA.

National Environmental Policy Act (NEPA)

MARAD and the USCG released a Final EIS/Environmental Impact Report (EIR) for the construction, operation, and decommissioning of the Port (see ADDRESSES). A notice of availability was published by MARAD on November 2, 2006 (71 FR 64606). The Final

EIS/EIR provides detailed information on the proposed project facilities, construction methods, and analysis of potential impacts on marine mammals.

NMFS was a cooperating agency in the preparation of the Draft and Final EIS based on a Memorandum of Understanding related to the Licensing of Deepwater Ports entered into by the U.S. Department of Commerce along with 10 other government agencies. On June 3, 2008, NMFS adopted the USCG and MARAD Final EIS and issued a separate Record of Decision for issuance of previous MMPA incidental take authorizations pursuant to sections 101(a)(5)(A) and (D) of the MMPA for construction and operation of the Port, which includes thruster use. The analysis in the Final EIS regarding the impact of noise generated by thrusters supports the findings under the MMPA for issuance of this proposed authorization. NMFS has preliminarily determined no additional analysis under NEPA is needed.

As a result of these preliminary determinations, we propose to issue an IHA to Neptune for taking marine mammals incidental to repair, maintenance, and decommissioning of the Port, Massachusetts Bay, provided the previously mentioned mitigation, monitoring, and reporting requirements are incorporated. The proposed IHA language is provided next.

Neptune LNG LLC (Neptune), is hereby authorized under section 101(a)(5)(D) of the Marine Mammal Protection Act (MMPA; 16 U.S.C. 1371(a)(5)(D)), to harass marine mammals incidental to maintenance, repair, and decommissioning of a liquefied natural gas (LNG) deepwater port in Massachusetts Bay when adhering to the following terms and conditions:

1. This Incidental Harassment Authorization (IHA) is valid for a period of one year from the date of issuance.

2. This IHA is valid only for dynamic positioning vessel thruster use associated with the maintenance, repair, and decommissioning of an LNG deepwater port in Massachusetts Bay.

3. General Conditions

(a) A copy of this IHA must be in the possession of the Neptune, its designees, and work crew personnel operating under the authority of this IHA.

(b) The species authorized for taking are provided in Table 1 (attached).

(c) The taking by injury (Level A harassment), serious injury, or death of any of the species listed in condition 3(b) of the Authorization or any taking of any other species of marine mammal is prohibited and may result in the modification, suspension, or revocation of this IHA.

(d) Neptune shall conduct briefings between construction supervisors and crews, marine mammal monitoring team, acoustical monitoring team, and Neptune staff or contractors prior to the start of maintenance, repair and decommissioning, and when new personnel join the work, in order to explain responsibilities, communication procedures, marine mammal monitoring protocol, and operational procedures.

(e) The entity may not conduct decommissioning work prior to May 1, 2017.

4. Mitigation Measures

The holder of this Authorization is required to implement the following mitigation measures:

(a) Any whale visually sighted or otherwise detected (*e.g.,* on the Navigational Telex (NAVTEX), NOAA Weather Radio, and North Atlantic right whale Sighting

Advisory System (SAS)) within 1,000 m of a vessel shall result in a heightened alert status which will require all project vessels to operate at slow speeds of four knots or less and any non-critical departure plans to be delayed.

(b) If a right whale call is confirmed on the two closest passive acoustic monitoring (PAM) buoys or on any three PAM buoys, all vessels will go into heightened alert status requiring all project vessels to operate at slow speeds of 4 knots or less and any non-critical departure plans to be delayed.

(c) Any whale sighted within or approaching 500 m of a vessel shall result in that vessel using idle speed and/or ceasing all movement. If the vessel is operating dynamic positioning (DP) vessel thrusters, the thrusters will be shut down or reduced to minimal safe operating power. The speed and activity restrictions shall continue until either the observed whale has been confirmed outside of and on a path away from 500 m from the vessel or 30 minutes have passed without another confirmed detection.

(d) Any non-whale marine mammal species detected within or approaching 100 m of a vessel shall result in that vessel using idle speed and/or ceasing all movement. If the vessel is operating DP thrusters, the thrusters will be shut down or reduced to minimal safe operating power. The speed and activity restrictions shall continue until either the observed marine mammal has been confirmed outside and on a path away from 100 m from the activity or 30 minutes have passed without another confirmed detection.

(e) All project vessels will remain at least 500 m away from any North Atlantic right whale and at least 100 m away from all other marine mammals. If a marine

mammal approaches a stationary vessel, that vessel will sit idle or turn off engines until the marine mammal has left the designated zone or 30 minutes have passed without another confirmed detection.

(f) All vessels shall utilize the International Maritime Organization (IMO)-approved Boston Traffic Separation Scheme (TSS) on their approach to and departure from the Port and/or the unscheduled maintenance/maintenance area at the earliest practicable point of transit in order to avoid the risk of whale strikes.

(g) Repair vessels, dive support vessels (DSVs), and heavy lift vessels (HLVs), will transit at 10 knots (18.5 km/hr) or less in the following seasons and areas, which either correspond to or are more restrictive than the times and areas in NMFS' final rule (73 FR 60173 [October 10, 2008]) to implement speed restrictions to reduce the likelihood and severity of ship strikes of right whales:

- Cape Cod Bay (CCB) Seasonal Management Area (SMA) from January 1 through May 15, which includes all waters in CCB, extending to all shorelines of Massachusetts Bay, with a northern boundary of 42° 12' N. latitude;
- Off Race Point SMA year round, which is bounded by straight lines connecting the following coordinates in the order stated: 42° 30' N. 69° 45' W.; thence to 42° 30' N. 70° 30' W.; thence to 42° 12' N. 70° 30' W.; thence to 42° 12' N. 70° 12' W.; thence to 42° 04' 56.5'' N. 70° 12' W.; thence along mean high water line and inshore limits of collision regulations (COLREGS) limit to a latitude of 41° 40' N.; thence due east to 41° 41' N. 69° 45' W.; thence back to starting point; and

- Great South Channel (GSC) SMA from April 1 through July 31, which is bounded by straight lines connecting the following coordinates in the order stated:

  42° 30' N. 69° 45' W.

  41° 40' N. 69° 45' W.

  41° 00' N. 69° 05' W.

  42° 09' N. 67° 08' 24'' W.

  42° 30' N. 67° 27' W.

  42° 30' N. 69° 45' W.

(h) All vessels transiting to and from the project area shall report their activities to the mandatory reporting Section of the USCG to remain apprised of North Atlantic right whale movements within the area. All vessels entering and exiting the Mandatory Ship Reporting Area (MSRA) shall report their activities to the USCG's northeast whale reporting system: WHALESNORTH. Vessel operators shall contact the USCG by standard procedures promulgated through the Notice to Mariner system. Information regarding the geographical boundaries and reporting details can be found at:

http://www.fisheries.noaa.gov/pr/shipstrike/msr.htm

(i) Prior to leaving the dock to begin transit, the project vessel must contact one of the protected species observers (PSOs) on watch to receive an update of sightings within the visual observation area. If the PSO has observed a North Atlantic right whale within 30 minutes of the transit start, the vessel will hold for 30 minutes and again get a clearance to leave from the PSOs on board. PSOs will assess

whale activity and visual observation ability at the time of the transit request to clear the barge for release.

(j) No vessels will transit from shore to the project site during nighttime or when visibility is reduced below 1,000 m, unless an emergency situation requires the vessel to transit during those times. Should transit at night be required, the maximum speed will be 5 knots (9.3 km/hr).

(k) All vessels will consult NAVTEX, NOAA Weather Radio, the NOAA Right Whale SAS or other means to obtain current large whale sighting information.

(l) If member of the crew visually detects a marine mammal within the zone of influence (ZOI) (3.45 km), they will alert the lead PSO on watch who shall then relay the sighting information to the other vessels to document take, determine if mitigation actions are necessary, as required by this IHA, and ensure action(s) can be taken to avoid physical contact with marine mammals.

(m) In response to any whale sightings or acoustic detections, and taking into account exceptional circumstances, all vessels shall actively communicate with the lead PSO and will take appropriate actions to minimize the risk of striking whales.

(n) Neptune must immediately suspend any repair, maintenance, or decommissioning activities if a dead or injured marine mammal is found in the vicinity of the project area, and the death or injury of the animal could be attributable to the LNG facility activities. Neptune must contact NMFS and the Greater Atlantic Regional Office (GARFO) Marine Mammal Stranding and Disentanglement Program. Activities will not resume until review and approval has been given by NMFS.

(o) Use of lights during repair or maintenance activities shall be limited to areas where work is actually occurring, and all other lights must be extinguished. Lights must be downshielded to illuminate the deck and shall not intentionally illuminate surrounding waters, so as not to attract whales or their prey to the area.

(p) Transit route, destination, sea conditions and any marine mammal sightings/mitigation actions during watch shall be recorded in the log book.

(q) The material barges and tugs used in Port repair, maintenance, and decommissioning shall transit from the operations dock to the work sites during daylight hours when possible provided the safety of the vessels is not compromised. Should transit at night be required, the maximum speed of the tug shall be 5 knots.

(r) All repair vessels must maintain a speed of 10 knots or less during daylight hours. All vessels shall operate at 5 knots or less at all times within 5 km of the maintenance, repair, or decommissioning area.

5. Monitoring

The holder of this Authorization is required to conduct marine mammal monitoring during port maintenance, repair, and decommissioning. Monitoring and reporting shall be conducted in accordance with the Monitoring Plan (see Application).

Visual Monitoring

(a) All vessel crew members will undergo environmental training. Crew members who will act as designated watch personnel during heightened awareness conditions will receive specialized observer training.

(b) All vessel operation requirements, guidelines and mitigation requirements will be clearly posted on the bridge of all project vessels.

(c) Neptune or its contractor shall provide a half-day training course to designated crew members assigned to the transit barges and other support vessels. This course shall cover topics including, but not limited to, descriptions of the marine mammals found in the area, mitigation and monitoring requirements contained in this Authorization, sighting log requirements, and procedures for reporting injured or dead marine mammals. These designated crew members shall be required to keep watch on the bridge and immediately notify the navigator of any whale sightings. All watch crew shall sign into a bridge log book upon start and end of watch. Transit route, destination, sea conditions, and any protected species sightings/mitigation actions during watch shall be recorded in the log book.

(d) Each DP vessel will employ three professional PSOs. Two PSOs will conduct continual visual watches on a shift basis during all daylight hours. Daytime PSOs will monitor the acoustic alert program when not on active visual watch. During the night, one PSO will monitor the acoustic alert program and will scan the area around the vessel using a thermal imaging or similar enhancement device for 15 minutes each hour.

(e) All professional PSOs will be approved by NMFS prior to the start of the project, will have at least one full year of marine mammal observation experience in the U.S. Atlantic, Pacific, or Gulf of Mexico, and will have experience in acoustic monitoring and baleen whale detection.

(f) Each non-DP vessel will designate one trained crew member to stand a dedicated watch during all vessel movement and during times of heightened awareness. All designated crew watch personnel will undergo a full day of project-specific mitigation and monitoring training alongside the professional PSOs.

(g) PSOs will be responsible for advising vessel crew members on the required operating procedures and mitigation measures that are defined in this IHA. PSOs will be responsible for providing the required observation and detection data during the decommissioning activities.

(h) Neptune shall maintain a passive acoustic monitoring array consisting of four near real-time autonomous recording units (ARUs) strategically placed around the north and south buoys.

(i) If a whale call detection alert is received, the PSO will review the data and confirm the signal is a whale call. Upon verification, the PSO will monitor the other buoys for call detections. If the PSO verifies detections from two other buoys, then it will be determined that a whale is within the heightened awareness area. Mitigation measures for acoustic detection of whales will be the same as those for visual detection described above.

6. Reporting

The holder of this Authorization is required to:

(a) Submit a draft report on all monitoring conducted under the IHA within ninety calendar days of the completion of marine mammal and acoustic monitoring or sixty days prior to the issuance of any subsequent IHA for this project, whichever comes first. A final report shall be prepared and submitted within thirty days

following resolution of comments on the draft report from NMFS. This report must contain the informational elements described in the Monitoring Plan, at minimum (see attached), and shall also include:

(i) Location (in longitude and latitude coordinates), time, and the nature of the maintenance and repair activities;

(ii) Indication of whether a DP system was operated, and if so, the number of thrusters being used and the time and duration of DP vessel operation;

(iii) Marine mammals observed in the within the ZOI (3.45 km in all directions)(number, species, age group, and initial behavior);

(iv) The distance of observed marine mammals from the maintenance, repair, or decommissioning activities;

(v) Changes, if any, in marine mammal behaviors during the observation;

(vi) A description of any mitigation measures (power-down, shutdown, etc.) implemented;

(vii) Weather condition (Beaufort sea state, wind speed, wind direction, ambient temperature, precipitation, and percent cloud cover, etc.);

(viii) Condition of the observation (visibility and glare); and

(ix) Details of passive acoustic detections and any action taken in response to those detections.

(b) Reporting injured or dead marine mammals:

(i) In the unanticipated event that the specified activity clearly causes the take of a marine mammal in a manner prohibited by this IHA, such as an injury (Level A harassment), serious injury, or mortality, Neptune shall

immediately cease the specified activities and report the incident to the Office of Protected Resources (301-427-8401), NMFS, and the GARFO Marine Mammal Stranding Coordinator (978-281-9300). The report must include the following information:

1. Time and date of the incident;
2. Description of the incident;
3. Environmental conditions (*e.g.*, wind speed and direction, Beaufort sea state, cloud cover, and visibility);
4. Description of all marine mammal observations and active sound source use in the 24 hours preceding the incident;
5. Species identification or description of the animal(s) involved;
6. Fate of the animal(s); and
7. Photographs or video footage of the animal(s).

Activities shall not resume until NMFS is able to review the circumstances of the prohibited take. NMFS will work with Neptune to determine what measures are necessary to minimize the likelihood of further prohibited take and ensure MMPA compliance. Neptune may not resume their activities until notified by NMFS.

(ii) In the event that Neptune discovers an injured or dead marine mammal, and the lead observer determines that the cause of the injury or death is unknown and the death is relatively recent (*e.g.*, in less than a moderate state of decomposition), Neptune shall immediately report the incident to

the Office of Protected Resources, NMFS, and the GARFO Stranding Coordinator, NMFS.

The report must include the same information identified in 6(b)(i) of this IHA. Activities may continue while NMFS reviews the circumstances of the incident. NMFS will work with Neptune to determine whether additional mitigation measures or modifications to the activities are appropriate.

(iii) In the event that Neptune discovers an injured or dead marine mammal, and the lead observer determines that the injury or death is not associated with or related to the activities authorized in the IHA (*e.g.,* previously wounded animal, carcass with moderate to advanced decomposition, or scavenger damage), Neptune shall report the incident to the Office of Protected Resources, NMFS, and the GARFO Stranding Coordinator, NMFS, within 24 hours of the discovery. Neptune shall provide photographs or video footage or other documentation of the stranded animal sighting to NMFS.

7. This Authorization may be modified, suspended or withdrawn if the holder fails to abide by the conditions prescribed herein, or if NMFS determines the authorized taking is having more than a negligible impact on the species or stock of affected marine mammals.

Dated: August 22, 2016.

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Donna S. Wieting,

Director,

Office of Protected Resources,

National Marine Fisheries Service.

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